IN THE CLAIMS

Please amend the claims as follows:

1-3. (Canceled)

4. (Previously Presented) The method according to claim 17, wherein at least one of a type of liquid media, the flow directions thereof, the distribution thereof, or the flow volumes are varied over the duration of an experiment.

5. (Previously Presented) The method according to claim 17, wherein, when cell culture chambers are connected in series, the liquid media are continuously passed on from cell culture chamber to cell culture chamber.

6. (Previously Presented) The method according to claim 17, wherein a type of gases, the flow directions thereof, the distribution thereof, or the gassing concentrations are varied over the duration of an experiment.

7-9. (Canceled)

10. (Previously Presented) The method according to claim 17, comprising starting a first flow of media to one side of the membrane, namely, the apical side with the first cell culture, and starting a second flow of media that differs from the first flow of media to the other side of the membrane, namely, the basolateral side, with the second cell culture.

11. (Previously Presented) The method according to claim 17, comprising connecting different biological systems in series in corresponding cell culture chambers.

12-13. (Canceled)

14. (Currently Amended) The method according to claim [[13]] 17, wherein the continuous measuring of the relevant cell culture parameters includes software-aided measuring of the relevant cell culture parameters.

15-16. (Canceled)

17. (Previously Presented) A method for cultivating human or animal cells, one culture each of cells of at least one specific type being established in a defined environment and the cell cultures being supplied with assigned, liquid nutrient media, growth factors, and gases, the method comprising:

establishing at least two different types of cell cultures inside at least one cell culture chamber of a cell culture system, wherein two of the cell cultures, each of a different type, are established on a single gas-permeable membrane within the at least one cell culture chamber for a direct co-cultivation of both cell cultures, wherein one of the two of the cell cultures is established on a first side of the gas-permeable membrane, and the other of the two of the cell cultures is established on a second side of the gas-permeable membrane;

starting a flow of freely selectable, defined, liquid media in the at least one cell culture chamber in order to ensure a continuous supply for the at least two cell cultures;

starting a flow of different gases with freely selectable concentrations into the at least one cell culture chamber in order to ensure a constant, continuous gassing of the at least two cell cultures;

heating the at least one cell culture chamber in a regulated or controlled manner so as to ensure a constant temperature there over the duration of an experiment;

continuously microscopically observing at least one of the cell cultures inside the at least one cell culture chamber, without samples of the cell culture being taken over the duration of an experiment, wherein continuous microscopic observation is performed using a camera including a microscope attachment, the camera being disposed on a displaceable table for movement of the camera with respect to the cell culture chamber;

moving the camera with respect to the cell culture chamber while programming movement positions of the camera; and

continuously measuring cell culture parameters selected from the group consisting of pH values, lactate values and electric potential relevant to treating inflammation, cancer, cardiovascular disease, AIDS, relevant to programmed cell death, or relevant to blood coagulation, using sensors integrated in the at least one cell culture chamber.

18. (New) The method according to claim 17, wherein the continuous microscopic observation includes:

automatically determining cell contours during movement of the camera;

automatically storing the determined cell contours on the computer software; and

automatically recognizing those stored determined cell contours when the camera again moves past the cell culture chamber later on during the observation.

19. (New) The method according to claim 17, wherein a given number of cell culture chambers is established, these cell culture chambers being connected in series.

20. (New) The method according to claim 17, wherein a given number of cell culture chambers is established, these cell culture chambers being connected in parallel.

21. (New) The method according to claim 19, wherein, when cell culture chambers are connected in series, the gases are continuously passed on from cell culture chamber to cell culture chamber.

22. (New) The method according to claim 17, wherein the temperature prevailing in the at least two cell cultures within the at least one cell culture chamber is measured continuously and input as an actual temperature value into a corresponding temperature adjusting circuit or control circuit to enable a corresponding adjustment or control of the heating of the cell culture chamber.

23. (New) The method according to claim 17, comprising a video-supported microscopic observation of the at least two cell cultures in the at least one cell culture chamber.

24. (New) The method according to claim 17, comprising transmitting to a computer-controlled monitoring and control system data obtained by at least one of the continuous microscopic observation of the at least two cell cultures within the at least one cell culture chamber, the continuous measuring of the relevant cell culture parameters, or the continuous measuring of the temperature in the at least two cell cultures inside the at least one cell culture chamber, wherein the computer-controlled monitoring and control system is used to process the data.